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THE SUPPLEMENTARY SIGNS OF THE GREEK ALPHABET

THE following remarks about the supplementary or complementary signs of the Greek alphabet have to do primarily with the letters Φ χ Ψ and with the question of their "Eastern" or "Western" origin, arrangement, and equivalence. Discussion of these signs may justly begin with a paragraph near the end of Professor Kirchhoff's *Studien zur Geschichte des Griechischen Alphabets* in which the question at issue is put with admirable clearness — a paragraph which appears in the same words in the fourth edition of the *Studien* (1887) as in the first (1863). "Since the new signs χ Φ Ψ ," says Professor Kirchhoff, "notwithstanding their (in part) fundamental difference of signification and their varying arrangement, are yet in both groups [*i.e.* in the "Eastern" and in the "Western" alphabet] obviously identical in form, and since this cannot possibly be the result of accident, we must assume that they were invented, if not contemporaneously, as it should seem, at all events at one and the same place, from whence they were disseminated. Consequently, since we cannot attribute to those that were used with different values a double signification from the very beginning, one of these significations is the original; the other, that which arose later by arbitrary alteration. Furthermore, since the varying sequence of the Φ and χ in the alphabets of the [two] several groups stands plainly in a causal connection with this change of signification of the χ , this variation too can only be explained on the assumption that the one arrangement is to be regarded as the original; the other, as the altered and

secondary. The problem reduces itself to this: Which of the two groups is to be held to represent more faithfully the original condition, the Eastern or the Western?"¹

In the next paragraph — the last of the text proper of the *Studien* — Professor Kirchhoff in his first and second editions declared himself inclined to favor the Western origin of the signs. In the third and fourth editions he says instead that, important as the solution of the problem is for other questions concerning the development of Greek civilization, he does not believe that the epigraphical data at our disposal afford a sufficient foundation to build upon either way; therefore he prefers to reserve his decision in awaiting further epigraphical discoveries. That he still inclines — or until lately inclined — to believe in the Western origin of the signs in question might be inferred from his still in the fourth edition citing them in the Western order; but the inference would, perhaps, be an unfair one.

In what follows I shall endeavor briefly to examine what has been done in the way of discussion and discovery toward the solution of the problem indicated above from and during the year 1886, in which year the fourth edition of the *Studien* went to press.

In an article on 'The Early Ionic Alphabet' in the *Journal of Hellenic Studies* for 1886 (pp. 220–239) Mr. Ernest Gardner

¹ Da nun die neuen Zeichen $\chi \phi \psi$, trotz ihrer zum Theil grundverschiedenen Bedeutung und abweichenden Anordnung, identisch sind und dies unmöglich zufällig sein kann, so müssen wir annehmen, dass sie wahrscheinlich gleichzeitig, jedenfalls aber an einem Punkte ursprünglich zuerst erfunden sind und von da sich verbreitet haben, folglich, da den in verschiedener Werthung gebrauchten eine doppelte Bedeutung nicht gleich von Anfang an kann beigelegt worden sein, die eine die ursprüngliche, die andere die durch willkürliche Änderung erst später entstandene ist. Da ferner die abweichende Folge des ϕ und χ in den Alphabeten der verschiedenen Gruppen mit diesem Wechsel der Bedeutung des χ offenbar in | einem ursächlichen Zusammenhange steht, so lässt auch diese Abweichung sich nur so erklären, dass die eine Ordnung als die ursprüngliche, die andere als die abgeänderte und secundäre betrachtet wird. Die Frage ist nur, welche von beiden Gruppen als diejenige zu gelten hat, die den ursprünglichen Zustand am treuesten darstellt, die östliche oder die westliche. (*Op. cit.* pp. 173 sq., 4te Auflage.)

treated the symbols Φ X Ψ as Ionic and transmitted from East to West (p. 236). "It is a recognized rule," says he (pp. 236 sq.), "to which there are few exceptions, that the symbols of any one alphabet borrowed at one time from any other alphabet, invariably preserve the order they held in that other alphabet; and that new symbols, whether produced by independent differentiation or by fresh borrowing, are placed at the end in the alphabetic order, or next to the symbol from which they originated, as our own J, V, W. But this is only possible when the symbols are not also used as numerals in their alphabetic order. If we apply this rule to the last symbols of the Western alphabet, $+$, Φ , Ψ , we see at once that they cannot be derived from the Ionian Φ , $+$, Ψ . If we take the last two letters only, Φ , Ψ , there is no objection to meet as regards order. Hence $+$ must have been there before. Now this $+$ is used with the signification of ξ , but in these Western alphabets the alphabetic place of the Phoenician samekh and the Greek ξ is filled by a symbol evidently borrowed from the Phoenicians, but for practical purposes disused, \boxplus . Evidently what had happened here is the same as what we find in the case of ζ and ν . The Phoenician symbol is borrowed, and falls into practical disuse; but a secondary symbol evolved from it is placed at the end of the alphabet, and continues to hold its place in writing. Thus \boxplus survived as a symbol only, but $+$, its simplified form, continued to live and to represent the sound ξ . And the new form was naturally placed at the end of the alphabet. Now when the Western Greeks, already possessing this symbol, came to borrow from the Ionians Φ , $+$, Ψ , they could not adopt the $+$, simply because it was identical with the symbol they already possessed, and used to denote ξ . But the other two they borrowed, and put after their $+$ at the end of their alphabet; Φ they retained in its original form; but for the guttural aspirate they needed a sign far more than for the combination $\pi\sigma$ and accordingly they made the other new symbol, Ψ , serve to denote that sound."

The words just quoted form perhaps the most valuable part

of Mr. Gardner's article, albeit the part least heeded, it would seem. Whatever may be thought of his derivation of Western θ from \boxplus , his assumption of an entirely independent Western θ and his explanation of the arrangement of the supplementary signs of the Western alphabet as due to a grafting of the Eastern Φ χ Ψ upon an alphabet already possessing besides the A . . . V series an added symbol $\theta = \xi$ are at once bold and shrewd. But the lack of epigraphical evidence of the borrowing or adoption by one section of the Greek race from another of alphabetic signs with changed value left Mr. Gardner's theory in the position of other guesses at truth, viz. in that of mere conjecture. The epigraphical evidence required to give it higher rank was ten years in coming. In the meantime several other people tried their heads and hands at the problem.

Before taking up Mr. Gardner's successors we should note an important publication closely preceding his. Professor von Wilamowitz-Moellendorff in his *Homerische Untersuchungen*, published in 1884, gave it as his plain opinion (*op. cit.* p. 289) that the supplementary signs in question were of Ionic origin. Θ and χ he would derive from \boxplus . (Lenormant and Taylor had so derived Θ .) Ψ he thought a differentiation of Υ (in this coinciding with Clermont-Ganneau). "When this expanded alphabet came to the mother-country, Θ was received with unanimity, but the cross seemed rather a development from samekh than from \boxplus ; so it was employed for $\chi\sigma$, and Ψ for χ ; $\phi\sigma$ either received no special sign, or else a new and not very successful one." Mr. Gardner writes as though he did not know of this theory. We turn now to the later writers.

In a short article entitled 'Zur Geschichte des griechischen Alphabets,' published in the Athenian *Mittheilungen* for 1890 (pp. 235-239) and dated from Vienna in the preceding year, Emil Szanto set forth a rather fantastic theory about the signs we are considering. Starting with the theory broached by Professor von Wilamowitz-Moellendorff (as above), Mr. Szanto says that

it requires the assumption of the existence of a samekh with the value of ξ in the Western group at the time of its assumed act of borrowing from the Eastern. Besides, the influencing of one alphabet by another in such wise as to produce an unhomogeneous result seems to Mr. Szanto improbable. His own theory is as follows:

Φ is common to both groups in the same signification. It must be older than the division into groups. This no-group stage of the Greek alphabet is represented by the Theraean alphabet, which must have been the common Greek alphabet. [It may be fairly asked on what grounds a purely local alphabet can be called "gemeingriechisch."] The Theraean alphabet expresses the aspirates by $\otimes H$, $K H$, and ΓH , and ξ and ψ by $K M$ and ΓM . The analogy is disturbed by $\otimes H$ for τH , but there is no real difficulty; for both theta and tau are Phoenician. But as $\otimes H$ was written for τH , so ϕH and χH could be written after the invention of Φ and X to denote the aspirates, an apt mode of expression indeed if the sounds were affricates. The Numasios inscription seems to support the view that this was done. If that be so, there was once a stage of the common Greek alphabet at which the aspirates were denoted by $\otimes H$, ϕH , and χH , which gave way later (at least in the East) to simple \otimes , ϕ , and χ . — The oldest expressions for ξ and ψ were $\kappa\sigma$ and $\pi\sigma$. Between these signs and the Ionic stand the Attic $\phi\lessgtr$ and $\chi\lessgtr$. [These should be rather $\phi\lessdot$ and $\chi\lessdot$.] These are therefore relics of a once universal mode of writing. The Attic alphabet must not be regarded as an isolated phenomenon. From the Naxian $\Theta\lessgtr$ we can infer that at a time when X was as yet non-existent and the expression $\chi\sigma$ was therefore impossible, the expression $h\sigma$ appeared more adequate than $\kappa\sigma$. So we have to reconstruct a common Greek alphabet in which θ is $= \otimes H$, $\phi = \phi H$, $\chi = \chi H$, $\xi = \chi\lessgtr$, $\psi = \phi\lessgtr$, in which, therefore, the newly invented signs ϕ and χ had already either the value of ϕ and χ , or one very near it, one that could be rendered equivalent to it by the addition of an aspiration. [It is pretty hard to understand

what this sound might have been like.] H was soon dropped after Θ . Next came the attempt to simplify the other four double signs. This was done by dropping the second element. So X could be either χ or ξ (from XH or from X ξ). Both were tried. Hence arose the double equivalence. Owing to the great territorial extension of the Greek alphabet at this time geographical groups were formed. The Eastern cancelled H and gained a χ but lost a ξ , which was supplied by samekh. The Western cancelled ξ and gained a ξ but lost a χ . So in the case of the labials: in the East they got a Φ by cancelling H, but had to differentiate a Ψ out of Φ . In a similar fashion they could have got a ϕ in the West. But then ψ was not felt as a monophthong; so ϕ was gained as in the East. But a growing yearning for a χ led to the borrowing of the Eastern ψ to supply the want. "This solution," says Mr. Szanto, "presupposes a unity of the Greek alphabet until the time of the giving up of the four double letters and their replacement by single signs, likewise uniform adoption of the idea of employing the simple signs for these sounds; from this point, however, the ways part, and finally a sign is borrowed from the East for the West."—The varying arrangement of the signs in East and West can be easily explained. The two aspirates might be placed first, the two double consonants second; or the two gutturals first, the two labials second. In the East, the former arrangement was followed; but inasmuch as samekh, keeping its place in the alphabet, was used for ξ , only $\phi\chi\psi$ stood at the end. In the Western alphabets that have $\xi\phi\chi$ the aspirates follow the double consonants; in those that have $\phi\chi\xi$ either the principle of juxtaposition of labials and gutturals is followed or that of grouping aspirates and double sounds. In either grouping the labials have the precedence.

There are some "spunks of sense" in all this, but they are not enough to set the river afire. The theory found small favor with the next disputant, Ernst Kalinka, who, in an article, 'Eine boiotische Alphabetvase,' in *Ath. Mitth.* 17

(1892), pp. 101–124, dated from Florence, November, 1891, disagrees with Mr. Szanto in many things. He too doubts whether any part of the Greek race borrowed a number of signs from another in such wise as to leave to one sign its original signification, while giving to others an entirely different value. But the pleonastic $\Theta \Xi$ and $\chi \Xi$ are not found [Mr. Kalinka sets aside the proof of the existence of the former derived by Mr. Szanto from Nicandre's inscription] and Θ was not a dental aspirate. He finds it hard to believe that two signs were invented that were intended never to be used singly but always in connection with another sign. The $+$ in its position after \vee , which is peculiar to the Western Greeks, belongs to the earliest period of the separate development of the alphabet. The aspirate group $\Phi \chi$ was next added. The East went a step farther in adding ψ . The earliest step to the independent development of the Greek alphabet was the Ionic mutation of value of samekh to ξ . Samekh was dealt with as the vowel signs and zayin had been dealt with. $\kappa\sigma$ was written in Ionia before ξ came into use. In Attica ξ was not introduced because of a difference of pronunciation. But $\pi\sigma$ and $\kappa\sigma$ were not adequate representations of the sound. Therefore, the Attic Greeks invented Φ and χ , the former out of Θ , the latter out of χ . The Western Greeks did not accept χ : they had that sign in use already in a different sense. But they realized the value of a sign for the guttural aspirate; so they made Ψ out of koppa (an abbreviation of $\Phi \Xi$) by cutting off its top. The new sign naturally grew more angular [perhaps withering after its top was cut off like the cabbage-palms in the *Anabasis*]. The East made Ψ out of the Athenian $\Theta \lessgtr$.

In the same year with Mr. Kalinka's rather remarkable article, but too early to take notice of it, appeared Dr. Wilhelm Larfeld's treatise on Greek epigraphy in von Müller's *Handbuch* (dated 1891). Dr. Larfeld, on more than doubtful grounds, would carry back the Ionic — more precisely, the Milesian — alphabet, including Ω , to 800 B.C. $\Phi \chi \Psi$ are to him of Eastern — more precisely, Milesian — origin and are

derived from koppa, tau, and ypsilon respectively. Their position answers to the order of those signs. The Western arrangement ξ φ χ (+ ϑ Ψ) is a mechanical and unmotivated suffixing of the Eastern signs. The failure to take over the Eastern signs directly is due to difference of pronunciation in the West.

In 1893 W. Schmid published in the *Philologus* (52, pp. 366-379) a paper 'Zur Geschichte des griechischen Alphabets.' Starting with adverse criticism of Szanto, the author goes on to say that the testimony of the inscriptions forces us to the conclusion that Φ was invented to express ph (spirant). So X to express ch (spirant). We must, he says, assume the following principles [better, principle and corollary] in judging any alphabet properly so called: (1) Each sign is = a vocal atom (Lautatomon). (2) This applies to signs derived from a foreign alphabet and *a fortiori* to those that are newly invented in the alphabet in question. The history of the alphabet cannot be separated from that of sounds and dialects. Simple signs for the aspirates were used when the aspirates approximated the fricatives. X and Φ were spirants. The change of aspirates to spirants in Greek goes hand in hand with the repression of the independent aspirate. The consummation of the process appears in modern Greek, the most important phonetic peculiarities of which were almost all developed before our era, but were hidden under the crust of conventional literary speech and spelling. So we may assume, continues Dr. Schmid, that the spirant pronunciation of the aspirates arose where the *spiritus asper* first gave way, *i.e.* among the Aeolians and Ionians of Asia Minor. The invention of Φ and X was the first alphabet innovation in the Eastern alphabet group. That is proved by the alphabets of Asiatic affinities that show Φ and X, but not Ξ and Ψ, viz. the Attic and the Naxian. Next came the invention of the signs for the assibilates. To Ξ the arbitrary value κσ was assigned. The assibilates were introduced before the seventh century. In the Western group of alphabets X was not taken from the

Eastern, but independently developed (= $\kappa\sigma$). This was felt as the first desideratum in the West. It is to be noted that the Western group is prevailingly Doric. KM at Thera and Melos may perhaps indicate that the aspiration before σ disappeared early among the Dorians. The coincidence in form in + between East and West is purely accidental. "Already in possession of an alphabet of twenty-four signs, the Western group became acquainted with the three new inventions, Φ χ Ψ , of the Eastern group. $\chi = \text{ch}$ they could no longer use; for they had it, or a sign very like it, already in use for ks . Only Φ and Ψ were available. Φ was accepted with its Eastern value; but an expression for ps was not needed, and to Ψ was given the value of ch ."¹

Thus far the discussion of the problem has proceeded without fresh epigraphical discoveries. It has been somewhat complicated by the introduction of the question of pronunciation, but all the disputants have favored more or less the sonant pronunciation of ϕ and χ — Dr. Schmid most emphatically. In an article entitled 'Die sekundären Zeichen des griechischen Alphabets' published by Dr. Paul Kretschmer in the *Ath. Mitth.* for 1896 (pp. 410–433) and dated "Berlin, Dez. 1896," a new theory is proposed and, better still, a new epigraphical discovery is utilized, though not so fully as it might be.

With Szanto Dr. Kretschmer agrees in one point: he, too, would make χ a simplified $\chi \approx$ (p. 426). But he arrives at the former sign by a different way. In opposition to Schmid, he seeks to prove untenable the view that ϕ and χ could represent spirants at the time of the invention and propagation of the secondary signs (pp. 412–420). In this he believes he has succeeded. He next discusses the question, why the Greeks felt the need of a ξ . In the Naxian sign \square [which, and not Θ , the stone shews] he sees, with Kalinka, a guttural

¹ I may note here that Dr. Schmid's explanation of the place and manner of the introduction of the spirants ("aspirates") is *a priori* both reasonable and natural, and appears to be the only one that suits the facts.

spirant — or, at any rate, a guttural that was neither κ nor χ [the latter being an aspirate in his view]. So in the Rhodian Euthytidas inscription (*I. G. Ins.* I, 709) he sees in $X \lessapprox$ not $\xi\sigma$, but a guttural, like the Naxian \square , plus a σ . He would place Boeotian $+\varsigma$, which occurs side by side with $\Psi (= \xi)$, on the same footing as Rhodian $X \lessapprox$. It is plain, Dr. Kretschmer thinks, that in general ξ was not $= \kappa\sigma$. Was the X or Ψ of $X \lessapprox$ and $\Psi \lessapprox$ aspirate or spirant? $K \Xi M$ does not occur at Thera: only KM . But if in $X \lessapprox$ the X is spirant, Φ should be spirant in $\Phi \lessapprox$. But we have no proof of such a pronunciation of ψ , and Eastern $+\varsigma$ side by side with $\Psi \varsigma$ is against it. ξ and ψ are not, in Dr. Kretschmer's view, parallel. ξ is $= khs$ passing to guttural spirant plus s . Thus, Dr. Kretschmer thinks, we have got the key to the mystery. "We are brought to an alphabet in which χ is represented by Υ , as in the later Western alphabets, and the guttural of ξ by X , as in the Eastern alphabets. This alphabet leads forward to the Western series: $X \lessapprox$ could be abbreviated to $X = \xi$, inasmuch as the guttural spirant occurred only before σ , and the omission of sigma, therefore, would cause no misapprehension." Again: "The Eastern alphabet with X for both χ and the guttural element of ξ represents the older manner of writing. Since the guttural element of ξ was spirant, or became so, the necessity arose of distinguishing this spirant from kh also in writing. At Naxos a variant of Heta was employed for the guttural spirant. In the West a new sign for the aspirate (Ψ) was invented that was diffused over most of continental Greece, and was carried also to Rhodes, Sicily, and Italy. In the East the quiescent samekh was employed for ξ . In Attica and in most of the Cyclades the old style was maintained." In the alphabets that employed ξ the phonetic group ps (phs) received a special sign for symmetry's sake, viz. the Western $\Upsilon = \chi$. We have epigraphical proof (presently to be given) that a letter could be borrowed by one alphabet from another with change of value; and as for the inexact analogy of ξ and ψ , we know that Archinus compared ψ with ξ and ζ in recom-

mending to the Athenians the introduction of the Ionic alphabet (Aristotle *Metaph.* 1093 a; Syrianus *Schol. Aristot. Metaph.* p. 940 b). The less frequent use of ψ also shews that less need of it than of ξ was felt. As for the arrangement of the supplementary signs, that has a phonetic basis. The aspirates always stand together. The original order was the Eastern. Υ was added to $\Phi \chi$. "In the West the newly invented aspirate sign Υ must, on account of the phonetic principle, stand after ϕ ; χ was placed either before the aspirates ($\chi \phi \Upsilon$ in the Chalcidian and Boeotian alphabets) or behind them ($\phi \Upsilon \chi$ in the Achæan alphabet)." ¹

¹ I have thought it well to present here in a footnote some further notes on the first part of Dr. Kretschmer's important article. Dr. Kretschmer sets aside the discussion of the formal development of the supplementary signs (p. 411). He does so, it seems to me, with too great flippancy. The matter is one of great importance. His arguments for the aspirate *versus* the spirant pronunciation of ϕ and χ (pp. 412-420) are not convincing. These do not represent the view of all philologists competent to deal with the subject; and even Dr. Kretschmer, as will have been observed, has to make a concession to the opposing view in the case of his combination of χ with sibilant. *It is this obstinate aspirate theory that stands in the way of the acceptance of so simple an explanation as that of Dr. Schmid, and forces upon us some very tortuous argumentation* A MINUS PROBABILI. Dr. Kretschmer's discussion of the reason for introducing a simple sign for ξ (pp. 421 *sqq.*) is not convincing, nor very consistent. His view of Naxian $\square \gtrsim$ seems very forced. The Naxian $\square \gtrsim$ was, I venture to think, developed before the introduction of the Ionic χ . Dr. Kretschmer says (p. 424) that only the fact that at Thera $K M$, and not $K \Xi M$, is written is against the aspirate pronunciation of χ (and $\Upsilon = \chi$). He says further (*ibid.*) that the fact that if $\chi \sigma$ is = guttural spirant + s, $\phi \sigma$ must be = fs is a grave objection to the view that the character in question is = guttural spirant. Dr. Kretschmer's statement (p. 424) that "die verschiedene Behandlung von ξ und ψ in den westlichen Alphabeten — für ersteres giebt es ein besonderes Zeichen, für letzteres im Allgemeinen nicht — weist darauf hin, dass diese Lautverbindungen nicht genau analog waren" falls to the ground, if the theory of a grafting of Eastern alphabet on Western that I with others maintain is correct. Dr. Kretschmer assumes (p. 426) an alphabet in which χ is expressed by Υ , "wie in den späteren westlichen Alphabeten, und der guttural von ξ mit χ , wie in den östlichen bezeichnet wird." But this "missing link" nowhere appears. "Vorwärts," continues Dr. Kretschmer, "führt dieses Alphabet zu dem Zustand der westlichen Reihe: $\chi \lessapprox$ konnte zur $\chi = \xi$ abgekürzt werden, weil der gutturale Spirant nur vor σ vorkam, also kein Missverständnis entstand, wenn man das sigma wegliess." This is surely a clumsy process. Is it like the Greeks? Dr. Kretschmer believes (p. 429) that the Aeolians "in archaischen Zeit, d. h. vor Einführung des ionischen Alphabet, das Zeichen χ im Sinne von χ verwendet haben." Surely

In the concluding section of his paper (pp. 430-433), Dr. Kretschmer discusses the archaic inscriptions found by Hiller von Gärtringen at Thera in 1896 (see *Ath. Mitth.* 21 [1896], p. 252 sqq., and the *Inscr. Gr. Insularum*), in addition to those that were previously known, and sums up our knowledge about the development of the Theraean alphabet. The first period has \beth [\beth] = β (confirming by several examples Professor Collitz's view), $\zeta = \gamma$, $\Theta = h$ and η , \otimes (twice $\otimes \Theta$), ς or $S = \iota$, $\Gamma = \lambda$, $\Phi = q$, $M = \sigma$, $\Gamma\Theta = \phi$, $K\Theta$ or $\Phi\Theta = \chi$, $KM = \xi$, and $\Gamma M = \psi$. But we can infer from a few examples, to be regarded as sporadic survivals, an earlier stage at which, as in Crete, K and Γ are = χ and ϕ respectively and Ξ is = η (cf. $\varsigma \wedge \beth \Theta$ in the Abron inscription). The use of Θ for η comes from a psilotic region — Crete or Ionia. It is not native to Thera. In the second period we have \otimes , $\varsigma = \iota$, and $M = \sigma$ (koppa too is found), but the Ionic aspirates [as Dr. Kretschmer calls them, although Ionia is to him a psilotic region] Φ and X have been introduced. We find also (perhaps more modern [though the reason for this designation is not plain]) ξ represented by Ψ in $\begin{smallmatrix} \Lambda \wedge \Xi \Psi \Lambda \\ \text{COR} \Lambda \end{smallmatrix}$, to be read Ἀλεξαγόρα . There are also (cf. *Ath. Mitth.* 1896, p. 221) one or two inscriptions at Melos with the same peculiarity. The solution of this puzzling use of Ψ is to be found in the use (testified to by these [four] Theraean inscriptions) of Ξ for ζ . There are also examples of $I = \zeta$, but they would probably be due to influence from without the island.¹ Dr. Kretschmer thinks (p. 433) that we have in this peculiar manner of writing proof that the Theraeans (and perhaps, too, the Melians) used the sign of samekh for ζ . [Would it not, I venture to suggest, be better to class the zeta with three horizontal bars with the four-barred epsilon that is

this is wrong in expression, whatever may be the fact, inasmuch as $X = \chi$ is Ionic.

¹ $\Xi \Xi \Psi M = \text{Zeús}$ appears twice at Corinth (Kretschmer, *Ath. Mitth.* 22 [1897], p. 343 sq.).

found in Boeotia?] “So when the secondary signs of the Ionic alphabets,” he concludes, “became known in Thera, the Theraeans took over the aspirate signs Φ and X for ϕ and χ without change; but inasmuch as Ξ was still used among them for ζ , and, for the reason previously given, they had no need of a special sign for ψ , they changed the value of the Ionic sign for ψ to that of ξ . That happened at Melos too, unless the $\Upsilon = \xi$ there is a Theraean importation. The great value of this fact appears to me to lie in this, that the change of the Western $\Upsilon = \chi$ to the Eastern value ψ thus becomes really plausible.”

This contains an important element of truth, but we may draw further and, I venture to think, sounder conclusions. In the change of value of Ψ at Thera we see the result of a deliberate attempt on somebody's part to introduce into the Theraean alphabet the shorthand Ionic symbols for the double consonants and the spirants in addition to the signs already there. The procedure must, it seems to me, have been as distinct and deliberate as that. The Φ and X would be taken “ohne weiteres,” as Dr. Kretschmer says; the change of value of Ψ was, as he also says, due to the pressure of $\Xi = \zeta$; and we must, it should seem, also admit, without, however, accepting his view of the reason, that greater need was felt of a symbol for KM than of one for ΓM .

We may now apply a similar course of reasoning to the introduction of the Ionic symbols into the West (and here we may make, with Mr. Gardner, Dr. W. Schmid, and Dr. Larfeld, the assumption that the supplementary symbols in the West came from Ionia—or, more precisely, Miletus). Suppose a Western alphabet with $+=\xi$ after Υ . Suppose that the users of that alphabet, or rather some small group or individual among them, deliberately sought to graft upon it the Ionic (Milesian) supplementary signs for the spirants and for the double consonants that they lacked; or, more precisely, that they sought to perfect their alphabet by the addition from an Ionic source of signs for *ph*, *ch*, *ps* (*phs*), *in*

that order and at the end of their alphabet. In the case of the first sign they could accept — and did, I believe, accept — value and symbol together. In the case of the second sign they could accept the value, but they could not accept the symbol on account of their $+=\xi$. Therefore they cancelled the symbol but accepted the value, attaching that value to the third symbol. They were thus left without a symbol for ψ . In this process we seem to see a deliberate attempt on the part of some one — an earlier Archinus — to enlarge the scope of alphabetic expression by the addition of signs and values together and, so far as possible, in a traditional order, — a fully conscious and systematic procedure. This rests on an assumption — on assumptions, if you will —, but the *reductio* has not been brought, perhaps (as I trust) cannot be brought, *ad absurdum*.

In conclusion I venture to call attention to another case of a change of value of an imported symbol (also Ionic) which can, I think, be detected at Paros, Siphnos, Thasos, and Delos. Here the close o-sounds are represented by Ω , the long open one by O; whereas the reverse is the case in Ionia (Miletus). At Melos we have a differentiation of the symbols for the o-sounds in the same direction as at Paros etc., but in a manner independent of Ionia ($C = o, ov$; $O = \omega$). Now the Parian and Milesian systems must hang together, and all plausibility lies in favor of the Ionic system being the original. But why should the Ionic symbols have been reversed in their values at Paros etc.? There seems to be but one reasonable answer to this, viz. that in an earlier stage of the Parian alphabet (perhaps we should rather say the Delian alphabet) a differentiation of the o-signs had been made, either the same as at Melos — and hence connected with that method — or at least in the same direction. Upon this differentiation the Ionic differentiation was grafted, and the value of the Ionic symbols was thereby reversed, because the symbol developed from the O that was in use as a differentiative in the islands in question — or at the centre whence their alphabet spread — had

the value of the close *o*-sounds, not of the open. The Ionic (Milesian) differentiative had thus, on its acceptance in the Cyclades, its function changed to that of the local *O*. This explanation may have occurred to others besides myself, but I do not remember to have met with it elsewhere.

I would emphasize, what I believe our epigraphical data warrant, the view that alphabetic shifts and changes of the character of those I have been discussing were made among the Greeks with full consciousness and after much deliberation. The arguments attributed to Archinus at the official introduction of the Ionic alphabet at Athens are but the last stage of a movement that derived, as Dr. Schmid thinks, the spirant signs from the Phoenician $\textcircled{\times}$ and added the symbols for the double consonants to I. That the similarity of form of the quiescent samekh to I had much to do with the scheme of signs adopted for the double consonants seems, to me at least, very probable.

I venture to add a few bits of supplementary speculation.

(1) If the early spirant pronunciation of $\textcircled{\oplus}$ and the pronunciation among the Ionians of I as *ds* were demonstrable, it would be easy to set up a plausible theory of the way in which, in important particulars, the Greeks enlarged the Phoenician alphabet. $\textcircled{\oplus}$ plus $\textcircled{\times}$ (+) could be the filling out of a spirant scheme (the forms of the last two characters derived from the first, as Professor von Wilamowitz-Moellendorff suggested); I plus $\textcircled{\Xi}$ and Ψ would be the filling out of an assibilate scheme. Both spirant scheme and assibilate scheme would start with the dental. The similarity in form between I and $\textcircled{\Xi}$ as an element in the process I have already alluded to. It may be added that $\textcircled{\Xi}$ had already a place in the alphabet; therefore the fact that it precedes $\Psi = \psi$ does not imply that it was used = *ks* before the latter sign came into use. Ψ might be derived from Φ .

(2) We might trace the following stages of the development from the Phoenician alphabet into the Ionian (Milesian):

(a) The introduction (or rather, chiefly, adaptation and adoption) of vowel signs;

(b) The development and adoption of a group of spirant signs;

(c) The development and adoption of a group of assibilate signs;

(d) The development of signs for the open E and O vowels.

The question of the treatment of the various sibilants taken over from the Phoenicians must be dealt with apart.

(3) I have spoken above of a Milesian alphabet and of a Delian alphabet. Both would be connected with the culture that centred about important shrines of the great divinity of culture — Apollo. May not the great Delphic shrine have played its part? Should we say Delphian alphabet for Western alphabet?

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